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AN INAUGURAL DISSERTATION
ON
THE EFFICACY
OF CERTAIN
EXTERNAL APPLICATIONS.

BY HENRY JACKSON,

OF SAVANNAH, GEORGIA;

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AND CHEMICAL SOCIETIES.

“ Non recito cuiquam, nisi amicis, idque coactus.”

HORACE.

PHILADELPHIA:

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.....

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AN INAUGURAL DISSERTATION,
FOR
THE DEGREE
OF
DOCTOR OF MEDICINE;

SUBMITTED
TO THE EXAMINATION
OF THE
REVEREND JOHN EWING, S. S. T. P. PROVOST;
THE
TRUSTEES AND MEDICAL FACULTY
OF THE
UNIVERSITY OF PENNSYLVANIA,
ON THE 27th DAY OF MAY, 1802.

Mr. J. Cleaver
with but with

The Author

TO THE TWO INDIVIDUALS,

WHOSE generosity has enabled me to progress thus far, and whose ~~paternal~~ maternal care truly merits the epithet of parental, this ESSAY, the first effect of their common patronage, is dedicated, as the embryo testimony of a grateful heart.

The loss of the parental bosom, at an age when I had just begun to feel its value, the affectionate attention I have since experienced from those who have supplied its place, will ever impress me with a high sense of the duties attached to, and the important considerations comprehended in, the character and appellation of...BROTHER.

TO BENJAMIN RUSH, M. D.

PROFESSOR OF THE INSTITUTES AND OF CLINICAL
MEDICINE;

AND TO BENJAMIN S. BARTON, M. D.

PROFESSOR OF MATERIA MEDICA, NATURAL HISTORY,
AND BOTANY,

THIS DISSERTATION

IS

RESPECTFULLY DEDICATED,

AS A SMALL ACKNOWLEDGMENT

FOR THE

USEFUL INFORMATION AND FRIENDLY ATTENTIONS

RECEIVED FROM EACH OF THEM

DURING MY RESIDENCE IN

PHILADELPHIA.

TO DOCTOR JOHN BRICKELL,

OF SAVANNAH.

SIR,

A LIVELY remembrance of the friendly admonitions and instructive lessons, I have heretofore occasionally received from you, will not permit me to pass over the present opportunity of publicly returning you my thanks.

Accept, sir, I intreat you, this dedication as a small tribute of gratitude to you, particularly, for having first opened to me the delightful walks of botany, and directed my attention to a science as innocent and pleasing as it is instructive....A science, than which, none has a greater claim to the motto of "Utile cum dulci."

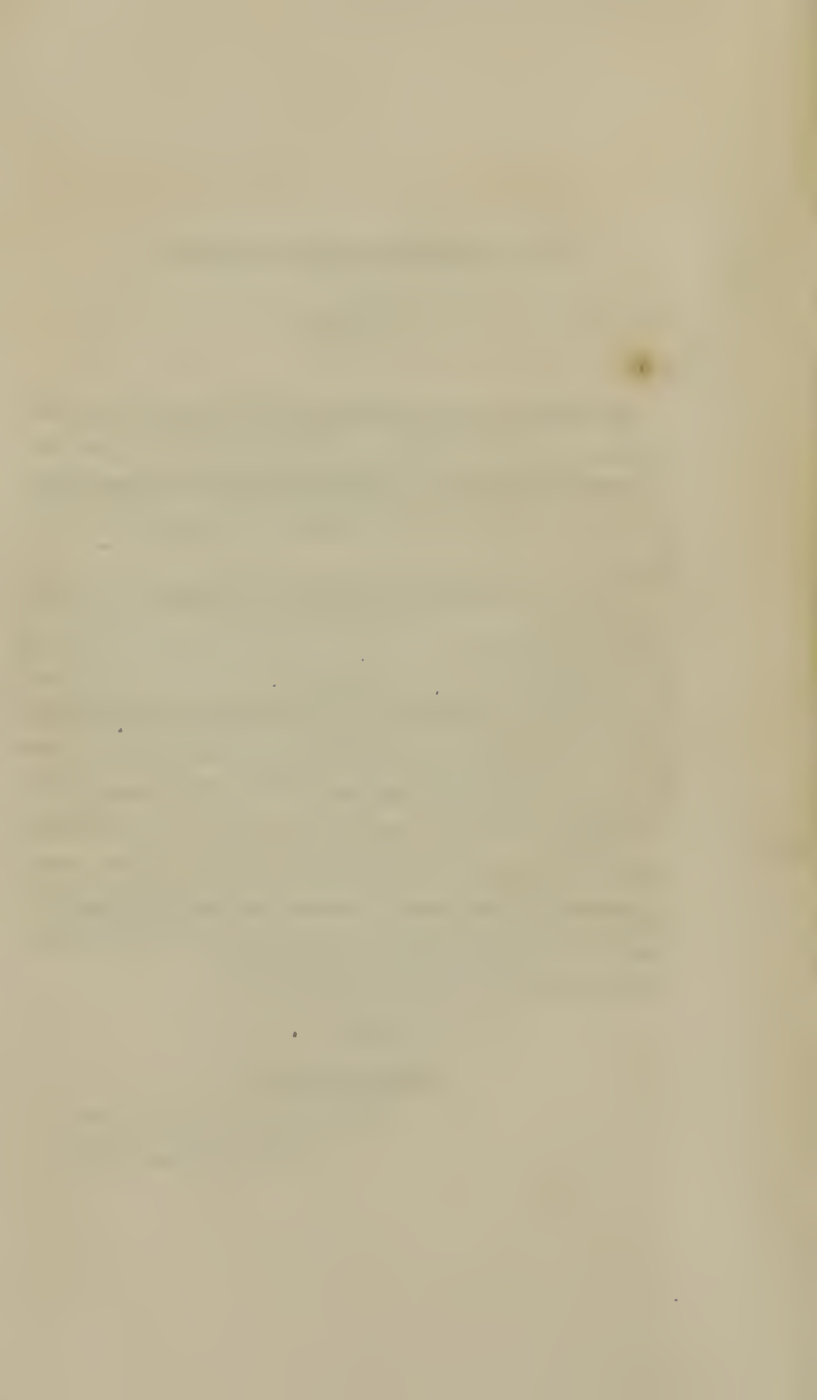
That your health may be preserved, so that your efforts to advance the cultivation of this, and the medical science in general, in a state that is rapidly advancing to importance, may be continued, and finally crowned with success, is the fervent wish of

Sir,

Your very sincere

And very obliged friend,

HENRY JACKSON.



AN INAUGURAL DISSERTATION
ON
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EXTERNAL APPLICATIONS.

THE period of the first application of medicines, to the external surface of the body, must have been very remote. The practice is, probably, to be ranked among the first attempts that were made, in the early infancy of our science, towards the removal of disease. At a time when chemistry had not yet discovered the different metallic preparations, or experience ascertained the nature and dose of the active vegetables, medical prescriptions were necessarily confined to external formulæ. Accident may have first suggested their utility. The common incidents of life must have afterwards established it. The relief afforded in febrile head-ach, by the application of cold water, or of a cool green leaf; the alleviation of pain in other parts of the body by means of warm fomentations, the gentle friction of the hand, emollients, sinapisms, and blisters, must all have tended to the confirmation and continuance of the practice. Ac-

cordingly, if we consult the *materia medica* of those people who have made but little improvement in the medical art, we shall find it to be composed chiefly of such articles, as relate to external application; such are the hot and cold bath, frictions, the potential caustic, and fomentations of different herbs. The majority of these items are, at present, among the principal remedies of the Indians of North-America.

In proportion, however, as the number of our medicines has increased, by the assistance of chemistry, natural history, and repeated experience, the manner of administering them has undergone a material change; and, at the present day, external applications, by being limited to local affections, to certain parts of the body, or to certain stages of a particular disease, may be said to be almost deserted. Whether or not this change has been justified by their deficiency of effect, or a want of success in their use, the following observations and experiments, may, perhaps, tend to show.



THE practice of applying medicines externally, is founded on the intimate connection of the skin, or external surface of the body, with every part of the system. This connection, on whatever it may depend, is illustrated by many familiar phenomena of life, both in health and disease. The languor and debility experienced on a hot summer day, the hilarity of mind, and activity of body occasioned by the coolness of a subsequent evening, are instances of it;

as well as the very sensible effects produced on the system, in regard to appetite, activity, gaiety, or the exercise of body or mind, by the sudden changes of our variable climate, in every season of the year. On this connection depends, also, that pleasing, though indescribable sensation, which every one must have experienced from a change of linen and fresh garments....a species of self-feeling, the gratification of which, forms, perhaps, the only justifiable luxury, as its indulgence, however far carried, can tend only to the preservation of health. In some persons we find the effects of this change to be very remarkable: an instance of which is mentioned by Dr. Rush, in a gentleman to the southward, who always has recourse to it with effect, in order to remove an approaching fit of hypochondriacism. A flannel shirt will excite, in a person unused to its irritation, a slight degree of fever; and, on the contrary, a departure from the usual quantity of dress, or of bed-covering, will occasion a catarrh, or a pleurisy. So intimate, in fact, is this connection, that an unusual, though apparently a very innocent impression, will produce sometimes a very alarming disease; in proof of which, there are instances of persons, during the late war, who were seized with convulsions, the first night they exchanged the earthen floor for the feather bed.

In disease, we find this connection to be equally, if not more strongly manifested. The powerful effects of cold applications to the skin, in hæmorrhagy.... the varying state of the skin itself, according to the state of the disease; and its affection as a premonitory symptom of disease, all evidence it. Hence the reason

of its having been considered by physicians, as early as the first annals of medicine, as of the first importance in forming a prognostic of the favourable or unfavourable issue of any general affection.

Do not all these circumstances, whilst they demonstrate the connection of the skin with the system, point out the propriety and utility of external applications? Another observation cannot but tend to strengthen this inference....it is, the extension of this connection in a state of health, to the mental part of our frame, by the common observation of mankind, which has long since made the colour of the countenance an index of the disposition; and whilst the blooming lively front has been considered as the attendant of a generous and open temper, the pale livid complexion has been received as the mark of one that is cold, selfish, and contracted.

We find this connection, however, to exist in a much more sensible degree, between the surface and particular parts of the system than others. The sympathy, as it is termed, between the skin and stomach is the most important, and appears to have given rise to the application of the generic term to connections of this nature. On it depend many physiological and pathological phenomena. The increase of the digestive powers by the external application of cold, the flushing of the face after a meal, the cure of sickness by a blister, of a diarrhœa by a flannel shirt, and many others, are to be referred to this important connection. This consent between the skin and the stomach, has been exemplified by two facts, so very decisive, it would be unpardonable not to mention them particu-

larly. The first is the well-known experiment of Doctor Hartley on a dog, to which he gave the nuxvomica, and then beat him severely. The action excited on the surface, prevented the operation of the drug on the alimentary canal, and no sickness ensued. The other is mentioned by the celebrated Darwin, and is still more to our purpose. "Two
 " dysenteric patients," says he, " in the same ward
 " of the Infirmary at Edinburgh, quarrelled, and
 " whipped each other severely for a long time with
 " horsewhips; both of them were much better after
 " it." The success that attended Dr. Seaman's remedy, in New-York, in a case wherein a quantity of opium had been taken, whilst it is a proof of this connection, is a further confirmation of the utility of external applications.

A second particular connection of importance, appears to exist between the skin and the mind, but whether this is effected through the medium of the stomach, or is independent of it, may, perhaps, be doubtful. The remarkable connection between the stomach and the mind, so great as to influence the views, the desires, and the passions of man, and to have led, formerly, to the supposition that it was the seat of the soul, may account for the sympathy that exists between the skin and the mental part of our frame. That there is a connection, is proved by the effects of a fresh change of garments, mentioned before, and by the common observation of mankind. The effects of a cold wet day on our tempers as well as on our ability of mental exercise, must have been often experienced by all, and the influence of the

passions on the skin, particularly of fear, is almost too obvious to need a remark. Let it suffice to say, that the melancholic temperament will still continue to be known by the hardness and dryness of the surface, and the choleric, on the contrary, by its softness and moisture.

Among the external applications in use at the present day, the principal are sinapisms, blisters, frictions, and various ointments, the manner of administering which, seems to have been left chiefly to the judgment or caprice of the practitioner. In a department of medicine, however, which, from the foregoing observations, would no doubt be of the greatest utility if duly attended to, some care ought to be exerted in selecting those parts of the surface, which appear to possess a more intimate connection with the whole or with parts of the system....Are there any, that on this account deserve particular regard? Yes....the connection between the feet and the general system is so great, that they have been considered as the second greatest avenue of disease. To be convinced of this, we have only to reflect on the catalogue of morbid affections, induced by their imprudent exposure to cold or wet; and on the advantages resulting both in health and disease, from a careful preservation of their warmth, by the habitual use of flannel socks. Illustrative, and in proof of this connection is the practice of the untutored Indian, who, when obliged to pass a night in the woods, is careful

to place his feet as near as possible to the fire, neglectful of the position of the rest of his body; and by a provident attention to this apparently trifling circumstance the lives of two persons were preserved, whose progress in an open boat, across the Delaware bay, was impeded by the ice, and who were obliged to pass the whole of a severe winter night in this situation, without any other covering than what a single great coat could afford them.* This intimate connection has not escaped the discernment of physicians, and the feet accordingly have been the subjects of external application, whenever any powerful impression has been intended to be made on the system. It is not, however, sufficient to view them, merely as the parts to which a cataplasm or blister may be occasionally applied. Their connection with the system, entitles them to a more diversified regard. This is evident from the happy effects of Dr. Cullen's prescription in a case of obstinate costiveness;....after

* As a more extensive knowledge of this circumstance may be the means of saving the lives of others, who are so unfortunate as to be placed in a similar situation, I shall take the liberty of relating it as delivered from the chair of the practice of physic. The gentleman who was present, finding that their efforts to reach the shore would be unsuccessful, ordered his companion to seat himself in the bottom of the boat, to pull off his shoes and stockings, and open his bosom. Having done the same, and seated himself opposite to him, each placed his bare feet against the breast of the other. Thus interlocked, with the great coat thrown over them, they passed a very comfortable night. The ice the next morning was sufficiently strong to enable them to reach the shore with safety.

every remedy had been tried without success, he ordered his patient, the duke of Argyle, to walk barefooted, over a cold slab of marble....The consequence was an effectual catharsis.

Next to the feet, the wrists and ankles appear to be the most eligible parts for external application, as possessing the most intimate connection with the system....a pre-eminence that depends, probably, on the superficial situation of the blood-vessels. Is the spine, in this respect, entitled to any particular regard, as the country practice of curing intermittents, by anointing it with turpentine, would seem to indicate?....Of the importance of the Epigastric region, so near the capitol of the system, I shall say nothing; to enumerate its points of superiority would be to relate the principal features of the animal physiology.



Before I enter on the consideration of the following particular external applications, it is necessary to remark, that the experiments relative to them, were all performed on a subject in a state of perfect health, and that consequently there should be some allowance for the greater difficulty of making an impression on the healthy, than on the morbid system. That this is the case, was evident from the greater length of time requisite for the sinapisms of mustard, garlic, horse-radish, &c. to produce their effects. Fully aware, moreover, of the fallacy of experiment, particularly as it relates to the mere *frequency* of the pulse, I underwent, what may be termed, a prepara-

tory test, and found that by sitting still, with nothing on me but a flannel morning gown, the state in which the greater part of my experiments were performed, the frequency of my pulse was diminished twelve beats in a minute. It must, however, at the same time be observed, that this diminution in frequency was not attended by a diminution in any other respect. The fulness of the pulse appeared to increase in proportion as its frequency was lessened. These considerations will be applied by the candid reader to the individual experiments.

SWEET OIL.

In Italy there has existed, for many years, the practice of anointing the body with olive oil in feversa practice that has been strenuously recommended by the physicians of that country. This remedy has been used, not only in inflammatory, but also in bilious, and what have been improperly termed putrid fevers. Professor Murray, however, from theory I fancy, and not from observation, objects to it, and adds, as the reason, “ that it cannot fail to debilitate “ the stomach, to produce nausea and vomiting, and, “ from the strong smell which heat soon gives it, to “ corrupt the bile and increase the fever.”

Suspicious that a practice so ancient, and so strongly recommended, could not be perfectly inert, and to see the effects of olive oil when applied to the surface of the body, I underwent the following experiment :

Having breakfasted at eight o'clock....at ten, my pulse beating seventy-six strokes in a minute, its natural standard, I undressed entirely and threw over myself a flannel morning-gown, in which situation my pulse descended to seventy-two. About a quarter after ten, my whole body was rubbed over with oil, in twenty minutes after which there was a very perceptible diminution in the force of the pulse, though its frequency was little affected, varying between sixty-eight and seventy-two. At twelve o'clock the application was repeated, when a still further diminution in the force of the pulse took placein twenty minutes after it was weak, greatly contracted in its volume, and its frequency lessened to sixty-two. This diminution in force and frequency continued till two o'clock, when a third application was made, with a further diminution of frequency to fifty-eight. Every stroke of the pulse was now perfectly insulated and distinct. At four o'clock, six hours after the first application of the oil, the diminution in force still the same, the frequency at sixty, an impatience resulting from the irksomeness of the situation, made me put an end to the experiment.

I know not whether the increase or decrease of the irritative motions has any effect on our sensations, but about a half after two, whilst the pulse was at fifty-eight, I never in my life experienced a stronger sense of the lingering lapse of time....the space of a minute seemed to be immeasurably extended. To impatience I cannot ascribe it, for the satisfaction arising from the issue of the experiment, as far as it had been tried, made me anxious for its continuance.

From this experiment, the rationality of the Italian practice is evident, and Professor Murray's apprehensions, of debilitating the stomach and corrupting the bile, turn out to be perfectly visionary. A quarter of an hour after the oil was washed off, I dined, and felt no difference in the strength and ability of the digestive organs. Twice was this experiment performed with the same result. Had time permitted me, I should have made a third trial with it, in order to have watched its influence on the different secretions.

Can we, from the result of this experiment, account for the practice of anointing the body with oil, so common among the ancients, and at this day, among the inhabitants of warm climates? It is used in this manner by the people of Africa, and in some parts of Asia; and Captain Cook informs us, it is a particular custom among the inhabitants of the islands of the Pacific Ocean. Mr. Niebuhr, in his travels through Asia, mentions it in terms that are very pertinent. "The Arabs," says he, "pretend that this unction strengthens the body, *and wards off the heat of the sun*, to which, by going almost naked, they are very much exposed." The ancients considered the external use of oil as essential to the preservation of their health and vigour, as is shewn by an anecdote related by Pliny, wherein Pollio Romulus, who was above an hundred years old, in answer to the question of Augustus, how he had so effectually preserved the vigour of his body and the powers of his mind, replies.... "By the internal use of mulsum and the external use of oil." Does it promote lon-

gevity, as Lord Verulam supposed, by preventing the too great perspiration and sweat, or by diminishing arterial action, does it prevent the too great exhaustion of the excitability?

The external use of oil, in fevers, has not been confined to Italy. It has been used, at Grand Cairo and at Smyrna, in the plague; and, also, according to Piso, in the fevers of South-America. Would it be serviceable in every state of fever? Its sedative influence evidently appears from the foregoing experiment, and there can hence be no doubt of its utility in fevers of great morbid action....but, would it not be of equal, nay, of greater utility in those states of fever, wherein there is a high degree of cutaneous excitement, and wherein the application can come in contact with the very seat of morbid action? It is a remedy so innocent, and the prospect of service from it so favourable, that a few trials with it should not be neglected.

Oil has been used externally in other diseases, as well as fevers, strictly so called, particularly in dropsy; and its success, in a number of cases, has been announced to the world, by Dr. Oliver, in the forty-ninth volume of the Philosophical Transactions. The same success seems to have been experienced both in Germany and France, though, with respect to it, as with all other remedies, there are exceptions, and cases in which it appeared to be entirely inert. Friction was, in every instance, conjoined with it, and it is difficult to say, from the known efficacy of friction in dropsy, how much is to be justly ascribed to the oil itself. Since, however, from a more just

pathology of this disease, dropsy has been considered, not only as a consequence of fever, but a febrile affection itself, may not the oil by its sedative effects on the sanguiferous system, equalize the excitability and restore to the torpid lymphatics their natural proportion? In every case the quantity of urine was increased, a fact not to be accounted for by its merely moderating the action of the cutaneous absorbents. The cases related by Dr. Oliver are very remarkable. One of them was the consequence of hard drinking, at the age of fifty-seven, and another occurred in a woman at the age of seventy-two. Both of them were relieved. These cases should certainly lead to the more general use of a remedy so mild and safe as sweet-oil is, which cannot injure, should it not do any good, and especially when so little dependence is to be placed on what are termed diuretic medicines. Tissot supposed the efficacy of the external application of oil, in dropsy, to depend on its preventing the absorption of the humidity of the air, but Professor Murray, on this point, very justly remarks, that merely anointing the abdomen only, would, in this case, be of no avail, and that the application would be necessary over the whole surface of the body. Whilst the doctrine of absorption still remains doubtful, let us not have recourse to it, unnecessarily, to explain the action of a remedy whose results are so evident and so well tested by experiment and observation.

A great deal has been said on the efficacy of oil applied externally in that dreadful state of the system which is the consequence of the bite of a viper, and there is no doubt, from the foregoing experiment, of

its utility in the fever that is formed; but that it alone should be sufficient, without the aid of more efficacious remedies, may justly be liable to doubt. On a subject, in regard to which there are so many different opinions, and to which there is no doubt attached a great deal of fallacy, I can do nothing better than give a place to the following very just observations of Professor Murray. “ Vere venenatos fuisse plures, dubitare non sinunt peritia virorum qui experimentis adstiterunt, et effectus mali qui morsum exceperunt: quis vero veneno infestos fuisse omnes qui sanationem admiserunt, nos convincet? et quis, ejusdem malignitatis omnes et singulos venenatos esse, serio affirmabit? Ut igitur oleum quod unius speciei virus enervat, contra alius venenum nihil valere probabile sit! Variat præterea in una eademque specie morsus effectus pro profunditate vulneris diversa, pro parte vel magis vel minus nervosa, pro iræ, qua serpens succenditur gradu, pro copia salivæ venenatæ, et per aduncos dentes effusæ, *quæ post morsum unum et alterum inflictum parcius et debilius est*, pro numero vulnerum illatorum, pro majore vel minore sanguinis ex plaga effluxu, pro diversitate insuper temperiei animalium, vel caloris aëris. In tanto experimentorum numero horum momentorum aliquid facile potest neglectum esse.” After these observations, it may be well to remark, that Messrs. Geoffroi and Hanault, when commissioned by the Academy of Sciences, in consequence of the respectable testimony by which this subject was supported, to examine into the efficacy of olive oil in the bite of vipers, concluded, after a variety of experiments, that nothing could be

affirmed of its specific virtue. Some recovered without oil, and others, on whom the oil was applied, died. A letter, of a Mr. Miller, of Carolina, has lately appeared in the Medical Repository, in confirmation of the utility of this remedy. It stands, I believe, an insulated case in this country, and the credit attached to it should be regulated by this consideration. In respect to a disease, however, so fatal, and the issue of which is so rapid as to baffle our greatest exertions, every praise is due to a citizen, whose humanity led him to give such early publicity to a remedy, the effects of which, were apparently so beneficial.

Another disease, in which the external application of sweet oil has been of service is, diabetes. In the explanation of its effects here, also, recourse has been had to the absorbents; but diabetes, as well as dropsy, is a febrile affection, and in the cure of it, those remedies have succeeded best, which have directly diminished the action of the blood-vessels. Its utility, in this disease, has been established by the common practice of cure in Scotland, and has also been sanctioned by the authority of the late writers who have treated on it.

From the experiment, we may deduce the propriety of the domestic practice in applying oil to burns, wounds, and to parts inflamed by the bite of venomous insects. This observation will extend also to the use of the various mucilaginous herbs, gums, &c. which as nearly allied to oil, prove serviceable in the very same cases.

How does sweet-oil act? Does it prevent the action of the external air on the surface, which is to be ranked among those constant stimuli, the consciousness of which we lose through habit, or, “as all parts of the skin,” says Abernethy, “may be considered as the extremities of the body,” does it, by diminishing the action of the capillaries, lessen, also, that of the large vessels associated with them? Let the medical virtuoso decide.

ESSENTIAL OILS.

The external application of the essential oils has been much more common in the hands of the empiric, than in those of the real physician, by whom it would seem their efficacy has not been sufficiently estimated. However much the nostrums of the day deserve to be decried, as applicable to every state of the system, and to every stage of a disease, yet there are hundreds of well attested cases of their utility, when properly administered. The British Oil, and the Essence of Mustard, amidst the numerous injuries that have, no doubt, resulted from a promiscuous application, it cannot be denied, have proved very often successful,....a truth that should lead to the more frequent use, in similar cases, of those simple essential oils, which possess an equal, if not a superior virtue. That they are not inert, I conclude from the following experiments.

At eleven o'clock in the morning, my pulse at seventy-six, the neck, thorax, and abdomen, as low as

the hips, were rubbed over with the rectified oil of amber. The effect on the pulse was as follows :

In 5 minutes, pulse beat					
10	-	-	-	-	78
15	-	-	-	-	78
20	-	-	-	-	78
25	-	-	-	-	79
30	-	-	-	-	80
40	-	-	-	-	82
50	-	-	-	-	82
60	-	-	-	-	82
80	-	-	-	-	82
100	-	-	-	-	82
130	-	-	-	-	82
160	-	-	-	-	82

In fifteen minutes after the application, there was an evident increase in the fulness and force of the pulse, and which continued to augment during the first hour. From this to the end of the experiment, there was no perceptible variation. An increase in the heat of the body, and some fulness of head, accompanied the course of this experiment.

At half after nine o'clock....my pulse at 74....The neck, thorax, abdomen, and upper extremities were rubbed over with the spirits of turpentine....within a few minutes after which, a sensation of pricking was felt over the whole surface, to which it had been applied....and an infinitude of maculæ, very similar to

the first eruption of the measles, appeared, particularly on the back.

In 5 minutes,	-	Pulse beat	74
10	- - - - -		78
15	- - - - -		80
20	- - - - -		80
30	- - - - -		76

It was now re-applied, when in

5	- - - - -	74
10	- - - - -	76
20	- - - - -	78
30	- - - - -	78
40	- - - - -	76
50	- - - - -	76
60	- - - - -	74
80	- - - - -	70
100	- - - - -	66

The spirits of turpentine evaporated in about ten minutes after its application, which may account for its temporary effect on the frequency of the pulse, and for its not occasioning that increase in its fullness and force, which was produced by the oil of amber.

It is apparent, from these two experiments, that the essential oils, when externally applied, exert a stimulating effect on the system; and it has been the shortness of the time only, allotted for the preparation of an Inaugural Thesis, that has prevented my varying the experiments, so as to ascertain their pro-

portionate influence. Their virtue in paralysis, conjoined with friction, is acknowledged....What would be their effects in epilepsy? Would not the oil of amber, if applied to the whole surface of the body, sometime before the expected fit, prevent, by the permanency of its stimulus, its recurrence? The spirits of turpentine, by exciting a cutaneous inflammation, would no doubt prove serviceable in many of those local pains, wherein the morbid action is not so great as to indicate depletion. It has often given relief in chronic rheumatism, and in those modifications of it termed Sciatica and Lumbago.

PERUVIAN BARK.

The external application of this celebrated article of the *Materia Medica*, if effectual, cannot but be considered as of the highest importance. Taken internally, it is by no means an agreeable remedy, and in some cases, there appears an almost insuperable antipathy to it. In children, moreover, it is frequently impossible to get a sufficient quantity taken, to produce any advantage. This, however, is not all. Of late years, particularly in the most severe of our epidemics, the stomach has shewn a morbid irritability, that, by their premature evacuation, has prevented the due operation of medicines, taken internally. From this, therefore, and the additional consideration, that in the state of convalescence, the grand object of the physician is to exchange, as soon

as possible, medical for culinary stimuli, the external application of this article, if attended with success, will appear of infinite importance.

The Peruvian Bark has been applied to the surface in the form of cataplasm, fomentation, and the bark-jacket....the last of which is made by quilting two or three ounces of finely powdered bark, in a silken or muslin handkerchief, which is to be worn round the waist. My experiments with it, in this shape, which were numerous and greatly varied as to the time of application, have convinced me, that it exerts a constant and durable stimulus on the system. It always raised my pulse three, four, or five beats in frequency, increased it in fulness and force, and augmented the heat of the body.

The issue of these experiments, has been justified by the test of repeated experience. In the second volume of the London Medical Observations and Inquiries, there are related a number of cures effected by it in this manner. Dr. Barton informs me, that the venerable Rittenhouse prevented the recurrence of the intermittent fever, to which he was subject, by the constant use of the bark-jacket; and that in children, he has himself found it of essential service. So great in fact was its influence, that when, through oversight it was suffered to remain on till the complete formation of the paroxysm, it never failed to augment its violence. Cataplasms of bark, have also been used. In myself, when applied to the feet, they increased the fulness and force of the pulse, and prevented that diminution in frequency, which rest always produced. At the same

time a disagreeable sensation of heat and dryness, was evident in the palms of the hands.

It is scarcely necessary to say any thing further on the utility of this article, as an external application. One thought, however, suggests itself. In that stage of Typhus, or low state of fever, wherein the life of the patient depends on the hourly administration of the cordial draught, more necessary during the night than the day, and which is too often trusted to the presumed accuracy of an uninterested nurse, how often might a valuable life be preserved by the constant stimulus of the bark-jacket, exclusively of its good effects, as a continual application?



OPIUM.

The external use of opium, is supported by the venerable names of a Berghius and a Cullen... The former has ascribed to it considerable effects, and has even gone so far as to assert that it will vesicate. Dr. Cullen says he has often found the external application of it, relieve the pains and spasms of the stomach and intestines. To this might be opposed the authority of Wedelius, Alston, and Crump, whose experiments with this article, do not justify the assertions of these respectable characters. By the kindness of my intimate friend Mr. Jenkins, two opiate plasters were applied to the soles of the feet, and permitted to remain on for eighteen hours, without producing the least perceptible effect. Not satisfied with this, I

applied, about 4 o'clock in the afternoon, an opiate plaster of four inches by five to the epigastric region, with an intention of suffering it to remain till the next day. I did not enter my bed in the evening, without some disagreeable apprehensions of the probable effects of the plaster before morning; my sleep however was not affected, and on removing the plaster about twelve o'clock the next day, it had not caused the slightest affection of the cuticle. What then are we to think of their frequent use; and shall we boldly declare, that both Berghius and Cullen laboured under a gross deception? In the *Annals of Medicine*, for 1798, there is an account of a letter from an Italian physician at Florence, on the external use of opium, in which he asserts that, "an opiate ointment made by incorporating a drachm of finely powdered opium, with a pound of axunge, so that an ounce contained six grains, was effectual in a number of instances, and although the sleep produced, was not always proportioned, either in intensity or duration to the dose of opium, yet a state of calmness always succeeded. Certain of the efficacy of the opiate ointment, he also tried frictions of laudanum diluted with alcohol, and found them equally successful." I have not tried the efficacy of the opiate ointment; but my experiments with laudanum, have been many. In one instance, more than an ounce of laudanum was, at different intervals rubbed on the abdomen, without its producing the least change in the pulse; and in another the neck, thorax, abdomen, and upper extremities were rubbed with it, till an ounce and a half was expended. In this last

experiment, the pulse was increased both in frequency and fulness, but this effect was very temporary, and the consequent depression was not such as indicated any previous considerably stimulant effect. Some fulness of head, and nausea also attended; but this was to be ascribed to the smell of the opium, which always induced these effects, in the person who was the subject of the experiment. Is, laudanum then, externally applied, entirely inert? or are not the experiments on the healthy subject conclusive and not to be admitted in contradiction to those made on the system, in the morbid state?....so great is the mass of evidence in favour of its utility, as an external application, added to the general use of it in this manner, over the whole medical world, that I am led to admit my own experiments, with the greatest diffidence.



TOBACCO.

This plant externally applied, promises to be of great utility as an emetic. Its efficacy has been particularly experienced in those cases, wherein poisonous substances have been taken into the stomach, the irritability of which, has suffered so much from the unnatural excess of stimulus, as not to be excited into vomiting by the usual emetics. In a case of this kind, after large doses of the antimoniated tartre of potash, and the sulphate of zinc, had been given to no effect, the application of this plant to the

region of the stomach, produced a sense of pain, hiccup, and finally vomiting. The operation of Tobacco appears to be particularly directed to the stomach and intestines; and it is immaterial, the interval between the time of the application, and the vomiting excepted, at what part the application is made. Vomiting seems to be the invariable result. Plenck in his *Toxicologia* relates that a woman, in order to cure three of her children of the *tinea capitis*, anointed their heads with an ointment made of butter and the powder of Tobacco; the consequences of which, were vertigo, vomiting, and syncope, that continued at intervals, for four and twenty hours. In another instance, the application of a decoction of the leaves, to a part on which there was an eruption, excited a vomiting of blood. The following experiment on myself, will show that it acts as a powerful emetic, though it is difficult to account for the interval that elapsed, between the application of the plant, and the period of vomiting.

At 12 o'clock some leaves of Tobacco after being cut into small shreds, and steeped in some warm water, were applied to the epigastric region. In the course of half an hour it raised the pulse from 74 to 80 beats in a minute, though it varied as to fulness and force. A slight nausea now and then occurred, and continued to occur after the application was removed. It was suffered to remain on for two hours, at the end of which time the pulse was down at 70. The nausea was so slight as not to prevent my dining. I suspected indeed some defect in the Tobacco, and had resolved to repeat the experiment the ensu-

ing day. About 4 o'clock in the afternoon, however, the nausea returned in a much greater degree, and in the course of half an hour a violent vomiting ensued, continuing at intervals till ten o'clock at night. The quantity of bile discharged was immense. So great was the association formed between the smell of the tobacco, and the retrograde action of the stomach, that I found it impossible to repeat the experiment with any degree of accuracy.

The utility of this plant as an external application in the cases above mentioned, is confirmed by the experience of Dr. Barton, who also thinks that its external use as an anthelmintic is too much neglected. A variety of other remedies applied to the surface have proved serviceable, and surely one, whose operation is particularly directed to the Alimentary canal, is deserving of attention and trial. A fomentation of the leaves is said to be useful when applied to indurated tumours.

We now come to the consideration of the vesicating applications.... A class of medicines which by their importance, so often the dernier resort of the physician, merit the greatest attention. Though of old date, they imply a greater advancement in the medical art than other remedies; for before man could be brought to suffer with indifference, the force done his feelings by their application, or reconcile the idea of curing one pain by exciting another, not only repeated experience of their efficacy, but some abstract

reasoning would seem to have been necessary. Whatever may have been their origin, or by whatever people they were first employed, their utility, sanctioned by the practice of ages, is not less confirmed by the test of daily experience. The common articles used for this purpose are the mustard, the horse-radish, the garlic, and the onion, to which are to be added from the animal kingdom, the American and the Spanish cantharides. To see their effects on the system, the following experiment was instituted.

At 10 o'clock in the morning, my pulse beating 80 strokes in a minute, accompanied with some degree of head-ach, two large sinapisms of strong mustard completely covering the feet, were applied to the lower extremities. They were suffered to remain on for four hours, more than one of which had elapsed before they occasioned any considerable pain. Very little variation in the frequency of the pulse occurred, if any, it was a diminution, but the increase of force, and particularly of hardness, was very considerable. About 12 o'clock the pain in my head and the disagreeable febrile heat I had experienced the preceding part of the morning, left me entirely. In the feet the increased glow of heat was very great, and towards the end of the experiment, resembled the sensation experienced by holding a part that had been scalded, near the fire. On removing the sinapisms and washing the feet, the pain ceased, but returned in about half an hour as violent as before, and I found it, during the remaining part of the evening, till 12 o'clock at night, disposed to remit and increase

at an interval of from half an hour to an hour. The pain and redness were evident during the two succeeding days.

The influence of this experiment on my temper was very manifest. During its continuance I felt irritable, and peevish; and not much inclined to answer any questions that were asked me. I found it impossible to attend to the subject of the work I was perusing, and in counting the frequency of my pulse, was obliged to commence again and again, before I could perform it accurately. The exertion it now required being much greater than what was before necessary.

The effects of horse-radish and of garlic were the same, though in a less degree; how far this was affected by some variation in the size of the applications, I will not venture to decide.

In addition to the above, I underwent the following.

Two blisters of the size of two inches by three, were applied to the inside of the legs, a little above the inner malleoli. They were suffered to remain on for twelve hours, at the end of which time they had produced an extensive separation of the cuticle, and a sore which required the delicate attention of the two succeeding weeks to heal. Their effects on the system were not by any means so powerful as those of the sinapisms; the pain arising from them was not so great, nor were the fulness, force or frequency of the pulse sensibly affected by them. We may hence draw the practical conclusion that blisters are chiefly suited for local affections, and that, when we wish to

make a powerful impression on the system, sinapisms should be resorted to. This conclusion I believe accords with the experience of every medical practitioner.

The importance of this class of medicines, is such, that they cannot be too particularly mentioned. The surprising effects of sinapisms in those states of the system, wherein the most powerful internal remedies have failed, and that have drawn from the suffering patient an inquiry by what charm he had been relieved, will stamp them as a remedy of the first magnitude in the mind of every candid physician. Their utility has been particularly experienced in the convulsions of children from teething and from small-pox, in affections of the breast and stomach, and in what has been termed irregular gout. In the vertigo and strangury that are the consequences of a retrocession of the gout from the feet, they have afforded almost immediate relief....and who will not assent to their usefulness in those low states of fever wherein a powerful stimulus is indicated? What would not the application of two large sinapisms effect in preventing the recurrence of the intermittent fever? Blisters have been used for this purpose, and surely the more powerful influence of sinapisms would be proportionably more efficacious in destroying that association on which the return of those diseases appears to depend. In fact exclusively of local considerations, should not sinapisms more frequently supplant the use of blisters, as their effects are more powerful, their immediate consequences to the parts do not prevent a second application, and they are not

followed by that disagreeable affection, which is so often the result of a blister.

Of the efficacy of the last, in diseases especially where there is a local affection, I shall say nothing.... This subject has been fully treated of, by an antecedent graduate. I shall only observe in regard to the experiment, that the sore which was the consequence of their application, acted as a considerable irritation on the system.

CAMPHIRE.

If domestic practice can sanction the efficacy of any remedy, we must consider this as one of the most valuable articles of the whole *Materia Medica*, for external application. It is in fact, in this country the family Panacea, and the bottle containing the camphorated rum, is resorted to with more faith and confidence in its utility, than the ancients used to attach to the influence of their domestic deities. As an external application, however, camphire has not been confined altogether to the private shelf, it is still held in considerable estimation, and frequently employed by the physician. Its power of occasioning the translation of gouty and rheumatic pains has been established, by a fact related by doctor Cullen, and has been further confirmed by the experience of doctor Barton. Its use therefore, should be attended with caution, especially where there is a disposition to irregular gout, or to affections of the more important viscera.

My experiments with this article, were made with the spirits of camphire, and with it in substance. The abdomen in one case, and the whole upper part of the body in another, were rubbed over with the former, and an agreeable sensation of heat and warmth was immediately perceptible over the whole surface to which it had been applied. The same sensation was excited in a greater degree, when it was applied in substance, in the form of cataplasm, to the feet. In none of my experiments with it, however, though various, could I discover, that it exerted any effect on the pulse.

By this it appears, that the principal utility of this article, as an external application, has been pointed out by domestic practice. What its effects may be in those states of the system wherein the excitability is accumulated, I must leave to a future more successful experimenter.



FRICTION.

The efficacy of this as an external application in many diseases is universally acknowledged. It is a remedy of an old date, and like sweet oil, has been used not only in the restoration, but also in the preservation of health. In some nations, particularly in China, it has become as necessary a part of their daily habits as the use of the bath or the razor; and an old gentleman is waited on by his *latralyptes* as regularly as he is with us by his barber. The effects of this process are said to be astonishing; that

he who before its commencement was languid, dull, and inactive is rendered by it sprightly, animated, and nimble.

The ancients considered friction as highly important, and with them also it was the separate duty of a particular set of people. Hippocrates himself is said to have written a treatise on the subject.

The effects of friction on the human frame may be in some measure estimated by those of currying on the horse, which a farmer will declare is worth half his feeding; and that it is essentially necessary to the preservation of his health and vigour. Contrary to this, however, it must be remarked that the celebrated Darwin will not suffer his horses to be curried. The reasons of a singularity so opposed to the common practice of the whole civilized world, are, I believe unknown.

Friction produces different effects according to the substances with which it is performed. In some cases the hand only is used, and proves often of great relief. Whether there is any difference between the hands of the two sexes, or how far the soft delicate hand of the female may be more effectual, agreeably to Corporal Trim's experience, I am at present not able to determine. Next to the hand soft flannel, linen, and the flesh brush are to be successively used, and the intensity of the application gradually increased. From an inattention to this last circumstance it arises that in palsy this remedy so often fails in restoring the lost excitability.

In rheumatism friction has proved a very useful remedy. Captain Cook is said to have been relieved

by it, of a violent attack of this disease, by the natives of Otaheite; and I am informed that a person now resides in Philadelphia, who has gained great credit in the cure of rheumatism, by the same remedy. He begins by gently stroking the inflamed part, and proceeds gradually to squeezing, pinching, and finally changing the inside for the back of his hand, makes some very severe impressions on it. His success it is said has been very great. In taking a view of the effects of this remedy, do not the virtues of the Metallic Points resolve themselves into those of simple friction.

Dropsy, however, is the disease in which friction has discovered the greatest utility, and in which it particularly merits our attention. On this point Dr. Rush has mentioned three important cautions, the observance of which is absolutely necessary to obtain the good effects of this remedy.....1. That the friction should always be upwards....2. Performed in a recumbent posture and....3. In the morning only. A neglect of these rules will render its application of no effect, though continued for months.

In palsy and a variety of obstinate affections, such as the stiff joint and club foot, friction has been found of great service. In fact it is surprising what alterations a patient use of this remedy for a few months will effect.



The external application of vinegar, in which nitre has been dissolved, has been recommended in

fever by Dr. Thornton, who is in the habit of ordering the bodies of his patients to be washed, and their arms to be plunged in a solution of it. Dr. Gregory often directs his patients, in what has been termed the putrid fever, to be washed with a sponge dipped in simple vinegar and water; and says he has known it to reduce the pulse, from 110 to 90 strokes in a minute, whilst the delirium and other threatening symptoms have soon after disappeared.

The external application of cold water alone, has been found very serviceable in yellow fever, agreeably to the experience of Professor Rush....“ Cold water,” says he “ was a most agreeable and powerful remedy in this disorder; I directed it to be applied by means of napkins, to the head; I also ordered the washing of the face and hands, and sometimes the feet with cold water; when applied in this way, it gradually abstracts the heat from the body, and thereby lessens the action of the system.”

How far does the application of cold water to the head, act as a preventive to disease?....On this subject, I hope I shall be pardoned for inserting the following. Standing one rainy afternoon at the door of my lodgings, I was struck by the conduct of an aged country Friend, who, in walking down the street, took off his hat, and exposed his head to the rain. My curiosity was excited by an act, which I could not help instantly condemning, as the offspring of a foolish prejudice. On inquiry, however, I find it is a common practice in the country, particularly during the time of harvest, when covered with sweat, they are

overtaken by a shower. An intelligent farmer, assures me, that it has often secured him from colds and fevers, with which others who were present with him at the time, and who neglected this precaution, were afterwards seized.

I have thus brought to a close this imperfect sketch, of a few only of the many external applications now in use. I regret exceedingly, that an opportunity did not offer, of seeing their effects on the system in the morbid state. A variety of experiments, which I underwent, have not been mentioned, either from suspecting some fallacy in their issue, or from a want of time to enable me to repeat them. If by this weak but honest attempt, I have removed one single impediment, from the path of a succeeding graduate, who may wish to enter on this fertile subject, I shall feel contented, and think the end of my Dissertation answered.

With my best wishes for the prosperity of the University, and a respectful tender of my thanks to its worthy professors, I conclude this first essay of a truly medical Tyro.

Nec semper feriet quodcunque minabitur arcus. HOR.

THE END.

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with magnesium bicarbonate. All
leaves supported with lens tissue.
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